

Claims

1. A device for treating the surface of containers with a plasma, comprising a kinematic system for the transport of the containers and a plurality of plasma generators operating at atmospheric pressure, each generator adapted to treat one container at a time, the plasma generator comprising a treatment gas supply system and an electrical power supply system comprising at least one transistor functioning as an interrupter, or an LC adapter, adapted for supplying current in pulses.

2. A device according to claim 1, characterized in that each generator is provided as a column having a diameter or a width close to or slightly greater than the diameter or the width of a container.

3. A device according to claim 1 or claim 2, characterized in that the power supply system includes or is connected to a control unit adapted to control the amplitude of the pulses of electric current, the slope of the leading edge of these pulses, their frequency and the time elapsed between two successive pulses.

4. A device according to one of the preceding claims, characterized in that the plasma generators are placed side by side on a carrousel of the kinematic system.

5. A device according to one of claims 1 to 3, characterized in that the kinematic system comprises an accumulation zone for the containers and in that a plurality of generators are positioned above this system for a batch treatment of containers.

6. A device according to one of the preceding claims, characterized in that the power supply system comprises a current source and in that the gas supply system comprises a gas distributor.

7. A device according to the preceding claim, characterized in that the source of current, the gas distributor and a control unit comprising a

microcontroller determine the plasma treatment program of each container, individually.

8. A device according to claim 6 or claim 7, characterized in that the current
5 source, the gas distributor and the microcontroller are provided in the same housing or as blocs above the container to be treated.

9. A device according to claim 5, characterized in that it comprises a pivoting guide for directing the loading of the containers in the plasma treatment
10 zone (20).

10. A device according to the preceding claims, characterized in that the treatment zone comprises rows for storing rows of containers in such a manner that the treatment of the containers is carried out therein row by row, as and
15 when the rows are filled by the containers.

11. A device according to claim 5, characterized in that it comprises two compartmented complementary zones upstream and downstream of the treatment zone (20), which are used for, respectively, placing the containers in
20 row in the treatment zone and discharging the containers from the treatment zone.

12. A device according to one of the preceding claims, characterized in that it comprises a central current source comprising a high frequency current
25 generator producing electric pulses which are determined by the signals sent to the gate of a triode, the high frequency pulses being sent in parallel to each plasma generator to produce, via the LC adapters, a discharge in the form of a network of filaments in each one of the containers.

30 13. A device according to one of claims 1 – 11, characterized in that the current source of the device comprises a central high voltage bipolar direct current source supplying the individual high speed and high voltage interrupter transistors of each plasma generator.

14. A device according to one of claims 1 - 11, characterized in that the current source of the device comprises a central high voltage unipolar direct current source supplying the generators provided with bridges comprising two high speed and high voltage interrupter transistors, in such a manner as to
5 create a discharge in the form of a "network of filaments".

15. A device according to one of claims 1 - 11, characterized in that the current source of the device comprises a central high voltage direct current source supplying the plasma generators provided with individual field transistor
10 systems, each having an CR amplitude-phase circuit, with the signal being modulated by a computer, each of these individual systems supplying electricity for a discharge in the form of a "network of filaments" on the inner surface of the container to be treated.

16. A device according to one of claims 12 to 15, characterized in that the high power elements of the circuit generating pulses of electric current are cooled in such a manner as to function in a non-steady heat transfer state.

17. A device according to one of the preceding claims, characterized in that
20 the kinematic system comprises pneumatic transport channels (62) in which the containers are moved by an air stream, the pneumatic transport channels being movable in a plasma treatment zone (20) of the device, in order to enable the access of the generator electrodes (54a) to the containers.

18. A device according to claim 3, characterized in that the control unit controls the execution of a program of distribution of gas portions to form the gaseous mixture constituting the treatment gas used in the plasma treatment of
25 the containers.